

**Response Under 37 CFR § 1.116
Expedited Procedure—Examining Group 2859**

REMARKS

Applicants have studied the Office Action dated September 26, 2005. Claims 7 and 19 have been amended. It is submitted that the application, as amended, is now in condition for allowance. Claims 8 and 20 have been cancelled. Claims 3-7, 9-10, 15-19, 21-22, 29 and 30 are pending. Reconsideration and further examination of the pending claims in view of the following remarks is respectfully requested. In the Office Action, the Examiner:

- (1) withdrew previously indicated allowability of claims 3-10, 15-22, 29, and 30 in view of newly discovered reference Davidson (U.S. Patent No. 6,140,141);
- (2-3) rejected claims 4, 7, 8, and 29 under 35 U.S.C. §102(b) as being anticipated by Davidson (U.S. Patent No. 6,140,141);
- (4-6) rejected claims 3, 9, and 10 under 35 U.S.C. § 103(a) as being unpatentable over Davidson (U.S. Patent No. 6,140,141) in view of Paniccia (U.S. Patent No. 6,251,706);
- (7) rejected claims 5 and 6 under 35 U.S.C. § 103(a) as being unpatentable over Davidson (U.S. Patent No. 6,140,141) in view of Yamada et al. (U.S. Patent No. 5,349,499);
- (8) rejected claims 15, 16, 19-22, and 30 under 35 U.S.C. § 103(a) as being unpatentable over Davidson (U.S. Patent No. 6,140,141) in view of Paniccia (U.S. Patent No. 6,251,706); and
- (9) rejected claims 17 and 18 under 35 U.S.C. § 103(a) as being unpatentable over Davidson (U.S. Patent No. 6,140,141) and Paniccia (U.S. Patent No. 6,251,706) in view of Yamada et al. (U.S. Patent No. 5,349,499).

Final Office Action Is Inappropriate In View of Newly Cited Art Davidson

As an initial matter, the Examiner made the Office Action final based on a new ground of rejection not stated in the earlier Office Action. Applicants respectfully traverse this decision. In the Final Office Action, the Examiner rejects the present claims 4, 7, 8, and 29 under 35 U.S.C. §102(b) as being anticipated by Davidson (U.S. Patent No.

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6,140,141); claims 3, 9, and 10 under 35 U.S.C. § 103(a) as being unpatentable over Davidson (U.S. Patent No. 6,140,141) in view of Paniccia (U.S. Patent No. 6,251,706); claims 5 and 6 under 35 U.S.C. § 103(a) as being unpatentable over Davidson (U.S. Patent No. 6,140,141) in view of Yamada et al. (U.S. Patent No. 5,349,499); claims 15, 16, 19-22, and 30 under 35 U.S.C. § 103(a) as being unpatentable over Davidson (U.S. Patent No. 6,140,141) in view of Paniccia (U.S. Patent No. 6,251,706); and claims 17 and 18 under 35 U.S.C. § 103(a) as being unpatentable over Davidson (U.S. Patent No. 6,140,141) and Paniccia (U.S. Patent No. 6,251,706) in view of Yamada et al. (U.S. Patent No. 5,349,499). The Applicants respectfully point out that the Davidson reference was not cited in any previous Office Action.

According to MPEP § 706.07(a): "Under present practice, second or any subsequent actions on the merits shall be final, except where the examiner introduces a new ground of rejection not necessitated by amendment of the application by applicant, whether or not the prior art is already of record." In the previous Office Action dated June 2, 2005, the Examiner indicated the allowability of claims 3-10 and 29. In the Applicant's response to the June 2, 2005 Office action, the Applicants did not amend allowed claim 7, from which claims 1-6, 8-10, and 29 depend. Claims 1-6, 8-10, and 29 also were not amended. The Examiner rejected claim 19 for omitting an essential step. Claim 19 was amended to add:

A method for detecting thermal characteristics ...
the photons indicative of thermal characteristics of the electronic device,

The Applicants did not switch from one subject matter to another or resort to any subterfuge to keep the application pending.¹ Thus it is respectfully submitted that the current final status of the Office Action is premature and should be withdrawn.

If the Examiner does not withdraw the final status of the Office Action, Applicants submit that this response does not raise new issues in the application. It is submitted

¹ See MPEP § 706.07.

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that the present response places the application in condition for allowance or, at least, presents the application in better form for appeal. Entry of the present response is therefore respectfully requested.

(2-3) Rejection under 35 U.S.C. § 102(b) Davidson

In items 2-3 of the Office action, the Examiner rejected claims 4, 7, 8, and 29 under 35 U.S.C. § 102(b) as being anticipated by Davidson (U.S. Patent No. 6,140,141).

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful. Amended independent claim 7 recites, *inter alia*:

... a photon detector located adjacent to the duct for detecting photons emitted from the electronic device, wherein the duct and the coolant are at least partially transparent to photons with wavelengths **between about 2.6 microns to 20 microns** and the duct is made of at least one of **polished silicon, quartz, sapphire, glass, and diamond**. (emphasis added)

The present invention is a device for measuring thermal distributions on a chip. The device includes a duct (805) above and coupled to an electronic device (101). The duct (805) has an at least partially transparent upper wall (804) and uses an upper surface (103) of the electronic device (101) as its bottom wall. Within the duct (805) is a transparent fluid (806) that flows over the top surface (103) of the electronic device (101) in order to cool the device. Para. 0053 and FIG. 8 of the instant application.

A photon detector (802) is located above the chip and measures infra red radiation emitted by the chip to calculate a thermal distribution of the chip. Para. 0056 of the instant specification. For proper measurement of a thermal distribution on the back of the chip, the photon detector must see through the duct and fluid to the back surface of the chip. See FIG. 8. For this reason, the materials (*the duct and the coolant*) of the present invention are selected so as to be *at least partially transparent to photons with wavelengths between about 2.6 microns to 20 microns*. Claim 7. Few materials are transparent at these wavelengths. Therefore, the present invention makes use of

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polished silicon, quartz, sapphire, glass, and diamond, which are all transparent to infrared radiation with wavelengths between 2.6 and 20 microns.

The invention of Davidson is not directed to measuring thermal distributions of chips, as is the present invention. Davidson senses voltages of signals on a die. Davidson, col. 3, lines 41-42. An important distinction between the two inventions is that the voltages are not measured by sensing infrared radiation, but by sensing a polarization of light reflected back from the device (Col. 1, lines 25-29) or by measuring the intensity of **near-infrared** radiation (Col. 2, lines 58-60) emitted from the circuit.

Near-infrared radiation, as is known in the art, is well defined as a range of wavelengths between 0.75 and 2.5 microns. Davidson gives two possible materials that are used for the window 110. The materials are fused quartz and BK-7 glass. Davidson, col. 3, lines 1-2. Both fused quartz and BK-7 glass are inoperable for thermal imaging, because they are not transparent to wavelengths above 2.5 microns.²

Claim 7 has been amended to recite the infrared frequency range that has wavelengths above the near-infrared range and materials that are transparent at those wavelengths. Therefore, the present invention, unlike Davidson, provides a duct and coolant that are at least partially transparent to photons with wavelengths between about 2.6 microns to 20 microns and a duct that is made of polished silicon, quartz, sapphire, glass, or diamond.

The Examiner cites 35 U.S.C. § 102(b) and a proper rejection requires that a single reference teach (i.e., identically describe) each and every element of the rejected

² For BK-7 Glass the “Useful Wavelength Range, Transmission (microns) 0.32-2.30” See for example <http://www.harricks.com/infoserver/Optical%20Materials/BK-7%20Glass.cfm> and http://www.mellesgriot.com/products/optics/mp_3_1.htm and for fused quartz see at least http://www.mellesgriot.com/products/optics/mp_3_2.htm

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claims as being anticipated by Davidson.³ Because the elements in independent claim 7 (at least "the duct and the coolant are at least partially transparent to photons with wavelengths between about 2.6 microns to 20 microns and the duct is made of at least one of polished silicon, quartz, sapphire, glass, and diamond") of the instant application are not taught or disclosed by Davidson, the apparatus of Davidson does not anticipate the present invention. Dependent claims 4, 8, and 29 are believed to be patentable as well because they are dependent on claim 7. Applicants respectfully submit that the Examiner's rejection under 35 U.S.C. § 102(b) has been overcome.

(4-6) Rejection under 35 U.S.C. § 103(a) Davidson and Paniccia

As noted above, the Examiner rejected claims 3, 9, and 10 under 35 U.S.C. § 103(a) as being unpatentable over Davidson in view of Paniccia (U.S. Patent No. 6,251,706).

In the section entitled "(2-3) Rejection under 35 U.S.C. § 102(b) Davidson" above, the deficiencies of the prior-art system disclosed in the Davidson reference were discussed. Claims 3, 9, and 10 depend directly from newly amended claim 7. Independent claim 7 distinguishes over Davidson. Since dependent claims contain all the limitations of the independent claims, claims 3, 9, and 10 distinguish over Davidson, as well. Accordingly, the Applicants respectfully submit that it is not necessary at this stage to address the Paniccia reference applied in the rejection of claims 3, 9, and 10, and whether or not there is sufficient suggestion or motivation with a reasonable expectation of success for modifying the Davidson reference, as required by MPEP § 2143. The Applicants respectfully request that the Examiner's rejection of claims 3, 9, and 10 be withdrawn.

³ See MPEP §2131 (Emphasis Added) "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim."

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(7) Rejection under 35 U.S.C. § 103(a) Davidson and Yamada et al.

As noted above, the Examiner rejected claims 5 and 6 under 35 U.S.C. § 103(a) as being unpatentable over Davidson (U.S. Patent No. 6,140,141) in view of Yamada et al. (U.S. Patent No. 5,349,499).

In the section entitled "(2-3) Rejection under 35 U.S.C. § 102(b) Davidson" above, the deficiencies of the prior-art system disclosed in the Davidson reference were discussed. Claims 5 and 6 depend directly from newly amended claim 7. Independent claim 7 distinguishes over Davidson. Since dependent claims contain all the limitations of the independent claims, claims 5 and 6 distinguish over Davidson, as well. Accordingly, the Applicants respectfully submit that it is not necessary at this stage to address the Yamada et al. reference applied in the rejection of claims 5 and 6, and whether or not there is sufficient suggestion or motivation with a reasonable expectation of success for modifying the Davidson reference, as required by MPEP § 2143. The Applicants respectfully request that the Examiner's rejection of claims 5 and 6 be withdrawn.

(8) Rejection under 35 U.S.C. § 103(a) Davidson and Paniccia

As noted above, the Examiner rejected claims 15, 16, 19-22, and 30 under 35 U.S.C. § 103(a) as being unpatentable over Davidson (U.S. Patent No. 6,140,141) in view of Paniccia (U.S. Patent No. 6,251,706).

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful. Amended independent claim 19 recites, *inter alia*:

... detecting, by a photon-detector, photons from an electronic device during operation of the electronic device, the photons indicative of thermal characteristics of the electronic device, the photon detector located adjacent to a duct that is adjacent to the electronic device, wherein the electronic device forms one side of the duct and a coolant flows through the duct so as to cool the electronic device and the duct and the coolant are at least partially transparent to photons with wavelengths **between about 2.6 microns to 20 microns** and the duct is made of at least one of **polished silicon, quartz, sapphire, glass and diamond**. (emphasis added)

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The deficiencies of the Davidson patent are discussed in the section entitled "(2-3) Rejection under 35 U.S.C. § 102(b) Davidson", above. The Examiner states that Paniccia discloses a prior art system that anticipates the present invention. However, the cooling duct 130 of the prior-art system disclosed in Paniccia is a solid piece of metal and is certainly not *made of at least one of polished silicon, quartz, sapphire, glass and diamond*. While coolant may be able to "pass across finned heat sink 130" shown in Paniccia (col. 3, lines 11 & 12), coolant cannot flow "through the duct so as to cool the electronic device", as recited in claim 19 of the instant application. More importantly, the solid metal cooling duct shown in FIG. 3A of Paniccia is not at all "partially transparent to photons."

Therefore Paniccia is not analogous to the present invention and one would not be motivated to combine the Paniccia reference with the Davidson reference. When there is no suggestion or teaching in the prior art, the suggestion can not come from the Applicant's own specification. The Federal Circuit has repeatedly warned against using the Applicant's disclosure as a blueprint to reconstruct the claimed invention out of isolated teachings of the prior art. See MPEP § 2143 and *Grain Processing Corp. v. American Maize-Products*, 840 F.2d 902, 907, 5 USPQ2d 1788 1792 (Fed. Cir. 1988) and *In re Fitch*, 972 F.2d 160, 12 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). The prior art reference Paniccia taken alone and/or in view of Davidson does not suggest, teach or mention a duct partially transparent to photons with wavelengths between about 2.6 microns to 20 microns and made of at least one of polished silicon, quartz, sapphire, glass and diamond. Accordingly, claims 15, 16, 19-22, and 30 distinguish over Paniccia taken alone and/or in view of Davidson for this reason as well.

(9) Rejection under 35 U.S.C. § 103(a) Davidson and Paniccia in view of Yamada

As noted above, the Examiner rejected claims 17 and 18 under 35 U.S.C. § 103(a) as being unpatentable over Davidson (U.S. Patent No. 6,140,141) and Paniccia (U.S. Patent No. 6,251,706) in view of Yamada et al. (U.S. Patent No. 5,349,499).

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In the section entitled (8) Rejection under 35 U.S.C. § 103(a) Davidson and Paniccia" above, the deficiencies of the prior-art system disclosed in the Davidson and Pannicia references were discussed. Claims 17 and 18 depend directly from newly amended claim 19. Independent claim 19 distinguishes over Davidson and Paniccia. Since dependent claims contain all the limitations of the independent claims, claims 17 and 18 distinguish over Yamada et al., as well.

Accordingly, the Applicants respectfully submit that it is not necessary at this stage to address the Yamada et al. reference applied in the rejection of claims 17 and 18, and whether or not there is sufficient suggestion or motivation with a reasonable expectation of success for modifying the Yamada et al reference, as required by MPEP § 2143. The Applicants respectfully request that the Examiner's rejection of claims 17 and 18 be withdrawn.

CONCLUSION

In this Response, Applicants have amended certain claims. In light of the Office Action, Applicants believe these amendments serve a useful clarification purpose, and are desirable for clarification purposes, independent of patentability. Accordingly, Applicants respectfully submit that the claim amendments do not limit the range of any permissible equivalents.

Applicants acknowledge the continuing duty of candor and good faith to disclosure of information known to be material to the examination of this application. In accordance with 37 CFR §1.56, all such information is dutifully made of record. The foreseeable equivalents of any territory surrendered by amendment are limited to the territory taught by the information of record. No other territory afforded by the doctrine of equivalents is knowingly surrendered and everything else is unforeseeable at the time of this amendment by the Applicants and their attorneys.

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Applicants respectfully submit that all of the grounds for rejection stated in the Examiner's Office Action have been overcome, and that all claims in the application are allowable. No new matter has been added. It is believed that the application is now in condition for allowance, which allowance is respectfully requested.

PLEASE CALL the undersigned if that would expedite the prosecution of this application.

Respectfully submitted,

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